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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/726,041	12/01/2003	Yasushi Saito	200300598-1	2665

22879 7590 05/22/2006

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EXAMINER

STACE, BRENT S

ART UNIT PAPER NUMBER

2161

DATE MAILED: 05/22/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/726,041	Applicant(s) SAITO ET AL.	
	Examiner Brent S. Stace	Art Unit 2161	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 01 December 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-69 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-69 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 May 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>3/15/04</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Remarks***

1. Claims 1-69 have been examined. Claims 1-69 have been rejected. This document is the first Office action on the merits.

### ***Information Disclosure Statement***

2. The information disclosure statement is being considered by the examiner.

### ***Specification***

3. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

### ***Drawings***

4. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "110" has been used to designate both user requests (specification, page 22, last line) and a main module (specification, page 22, third to last line). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate

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prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

5. Since the lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors, Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the drawings. For example, the drawings should be carefully checked to ensure that all reference numerals are described in the specification, that no one reference numeral describes two separate drawing elements, or that the specification contains no reference to numerals not in the drawings.

### ***Claim Objections***

6. Claims 11-12 are objected to because of the following informalities:

- a. Claim 11 recites "and forming of replica of" in line 6. This is poor sentence structure. This objection propagates downward through dependent Claim 12.
- b. Claims 56-69 recite mere intended use of the claimed invention (e.g. "for storing." Mere intended use has no patentable weight.

Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 16, 36, 56-69 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

9. Claim 16 recites "the replica includes a backpointer having an identification of a parent directory for the file and a name of the file within the parent directory" In lines 8-10. This fragment is unclear since it has two different interpretations. It is unclear if the replica includes a name of the file within the parent directory or if the backpointer has a name of the file within the parent directory.

10. Claim 56 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Since the claim does not distinct the preamble from the body of the claims. Examiner is unclear on what is the claimed invention. This rejection propagates downward through the dependent Claims 57-69.

11. Claims 60-64, and 67-69 recite the limitation "The method" in line 1. There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 102***

12. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

13. Claims 1-4, 7, 10-12, 16-21, 24, 26-28, 32-41, 44, 46-48, 52-59, 62, 64, 65, and 66 are rejected under 35 U.S.C. 102(b) as being anticipated by “Pangaea: A Symbiotic Wide-Area File System” (Saito et al.) (found in Applicant’s IDS).

**Claim 1** can be mapped to Saito as follows: “A method for a wide-area file system, including a plurality of replicas for a file, [Saito, page 1, section 1 “Introduction”] wherein each replica of the file and parent directories for the file are at each of a plurality of nodes, [Saito, page 2, Fig. 1, with Saito, page 3, section 2.1 “Adding A Replica”] the method comprising:

- propagating an update to a replica of the file to other replicas of the file; [Saito, pages 3-4, section 3.1 “Efficient Propagation Using Harbingers”] and
- in response receiving a propagated update to a replica at a node, updating the replica for the file at the node” [Saito, pages 3-4, section 3.1 “Efficient Propagation Using Harbingers” with Saito, page 2, section 2 “Managing Replica Membership”].

**Claim 2** can be mapped to Saito as follows: “The method according to claim 1, wherein each replica has a backpointer including an identification of a parent directory for the file and a name of the file in the parent directory” [Saito, page 2, Fig. 1, with Saito, page 2, section 2 “Managing Replica Membership”].

**Claim 3** can be mapped to Saito as follows: "The method according to claim 2, wherein the parent directories are modified when the backpointer for a replica at a node is not consistent with the parent directories for the replica at the node" [Saito, page 3, section 2.2 "Removing a Replica" with Saito, page 3, section 2.3 "Maintaining Hierarchical Name Space Using Golden Replicas"].

**Claim 4** can be mapped to Saito as follows: "The method according to claim 3, wherein modifying the parent directories occurs only after a delay" [Saito, page 4, section 3.1 "Efficient Propagation using Harbingers"].

**Claim 7** can be mapped to Saito as follows: "The method according to claim 2, wherein a directory operation affects the backpointer for the file" [Saito, pages 2-3, sections 2.1-2.3].

**Claim 10** can be mapped to Saito as follows: "The method according to claim 1, wherein the replicas include replicas of a first type and of a second type wherein locations of replicas of the first type are registered in a parent directory for a file" [Saito, page 3, sections 2.1-2.3].

**Claim 11** can be mapped to Saito as follows: "The method according to claim 1, wherein the replicas include replicas of a first type and of a second type and wherein in response to a user accessing a file at a node, the method further comprises steps of replicating the parent directory for the file at the node and forming of replica of the second type at the node" [Saito, page 3, section 2.1 "Adding a Replica" with Saito, page 2, section 2 "Managing Replica Membership" with Saito, page 3, section 2.3 "Maintaining Hierarchical Name Space Using Golden Replicas"].

**Claim 12** can be mapped to Saito as follows: "The method according to claim 11, wherein a minimum number of replicas of the first type are maintained according to a minimum replication factor for the corresponding file" [Saito, page 3, section 2.3 "Maintaining Hierarchical Name Space Using Golden Replicas"].

**Claim 16** can be mapped to Saito as follows: "A method for a wide-area file system, including a plurality of replicas for a file, [Saito, page 1, section 1 "Introduction"] and wherein upon access of the file by a user at a node, the method comprises steps of:

- replicating parent directories for the file at the node; [Saito, page 2, Fig. 1, with Saito, page 3, section 2.1 "Adding A Replica"] and
- forming a replica of the file at the node wherein the replica includes a backpointer having an identification of a parent directory for the file and a name of the file within the parent directory" [Saito, page 2, Fig. 1, with Saito, page 2, section 2 "Managing Replica Membership" with Saito, page 3, section 2.1 "Adding a Replica"].

**Claim 17** can be mapped to Saito as follows: "The method according to claim 16, further comprising propagating an update to a replica of the file to other replicas of the file" [Saito, pages 3-4, section 3.1 "Efficient Propagation Using Harbingers"].

**Claim 18** can be mapped to Saito as follows: "The method according to claim 17, wherein the update is forwarded according to a graph for the file" [Saito, page 2, Fig. 1, with Saito, page 4, Fig. 2 with Saito, page 2, section 1.3 "Challenges in Pangaea"].

**Claim 19** can be mapped to Saito as follows: "The method according to claim 17, wherein in response receiving a propagated update to a replica at a node, the node



updates parent directories for the file at the node" [Saito, pages 3-4, section 3.1 "Efficient Propagation Using Harbingers" with Saito, page 2, section 2 "Managing Replica Membership"].

**Claim 20** can be mapped to Saito as follows: "The method according to claim 17, wherein when a backpointer for a replica at a node is not consistent with parent directories for the replica at the node, the method further comprises modifying the parent directories to be consistent with the backpointer" [Saito, page 3, section 2.2 "Removing a Replica" with Saito, page 3, section 2.3 "Maintaining Hierarchical Name Space Using Golden Replicas"].

**Claim 21** can be mapped to as follows: "The method according to claim 20, wherein said modifying is performed only after a delay" [Saito, page 4, section 3.1 "Efficient Propagation using Harbingers"].

**Claim 24** can be mapped to Saito as follows: "The method according to claim 17, wherein a directory operation affects the backpointer for the file" [Saito, pages 2-3, sections 2.1-2.3].

**Claim 26** can be mapped to Saito as follows: "The method according to claim 24, wherein when the backpointer for a replica at a node is not consistent with parent directories for the replica at the node, the method further comprises modifying the parent directories to be consistent with the backpointer" [Saito, page 3, section 2.2 "Removing a Replica" with Saito, page 3, section 2.3 "Maintaining Hierarchical Name Space Using Golden Replicas"].

**Claim 27** can be mapped to Saito as follows: “The method according to claim 16, wherein a minimum number of replicas for a file are maintained according to a minimum replication factor for the file” [Saito, page 3, section 2.3 “Maintaining Hierarchical Name Space Using Golden Replicas”].

**Claim 28** can be mapped to Saito as follows: “The method according to claim 27, wherein links between replicas of a file form a graph for the file and wherein updates to the file are propagated along the graph” [Saito, page 2, Fig. 1, with Saito, page 4, Fig. 2 with Saito, page 2, section 1.3 “Challenges in Pangaea” with Saito, page 2, section 2 “Managing Replica Membership”].

**Claim 32** can be mapped to Saito as follows: “The method according to claim 16, further comprising locating a parent directory of the file” [Saito, page 2, section 2 “Managing Replica Membership” with Saito, page 3, section 2.1 “Adding A Replica”].

**Claim 33** can be mapped to Saito as follows: “The method according to claim 32, wherein said replicating the parent directories comprises copying contents of the parent directory located by said locating” [Saito, page 2, section 2 “Managing Replica Membership” with Saito, page 3, section 2.1 “Adding A Replica”].

**Claim 34** can be mapped to Saito as follows: “The method according to claim 33, wherein said locating and copying are performed recursively, thereby traversing a pathname for the file” [Saito, page 2, section 2 “Managing Replica Membership” with Saito, page 3, section 2.1 “Adding A Replica”].

**Claim 35** can be mapped to Saito as follows: “The method according to claim 33, wherein said forming the replica of the file comprises a copying contents of a replica of

the file located by said locating" [Saito, page 2, section 2 "Managing Replica Membership" with Saito, page 3, section 2.1 "Adding A Replica"].

**Claim 36** encompasses substantially the same scope of the invention as that of Claim 16 in addition to a method and some steps for performing the method of Claim 16. Therefore, Claim 36 is rejected for the same reasons as stated above with respect to Claim 16. Additionally, Claim 36 recites a limitation which is met by Saito as shown: "wherein locations of replicas of the first type are registered in a parent directory for a file, and wherein upon access of a file by a user at a node" [Saito, page 3, sections 2.1-2.3].

**Claims 37-41** encompass substantially the same scope of the invention as that of Claims 17-21, respectfully, in addition to an apparatus and some means for performing the method of Claims 17-21, respectfully. Therefore, Claims 37-41 are rejected for the same reasons as stated above with respect to Claims 17-21, respectfully.

**Claim 44** can be mapped to Saito as follows: "The method according to claim 37, wherein a directory operation is performed on the backpointer for the file" [Saito, pages 2-3, sections 2.1-2.3].

**Claims 46-48 and 52-55** encompass substantially the same scope of the invention as that of Claims 26-28 and 32-35, respectfully, in addition to an apparatus and some means for performing the method of Claims 26-28 and 32-35, respectfully. Therefore, Claims 46-48 and 52-55 are rejected for the same reasons as stated above with respect to Claims 26-28 and 32-35, respectfully.

**Claim 56** can be mapped to Saito as follows: "A system including a plurality of nodes for storing replicas of files wherein for each replica at a node, [Saito, page 1, section 1 "Introduction" with Saito, page 2, Fig. 1, with Saito, page 3, section 2.1 "Adding A Replica"] the node stores parent directories for the file and a backpointer having an identification of a parent directory for the file [Saito, page 2, Fig. 1, with Saito, page 2, section 2 "Managing Replica Membership"] and wherein updates to replicas of the file are propagated to other replicas of the file" [Saito, pages 3-4, section 3.1 "Efficient Propagation Using Harbingers"].

**Claim 57** can be mapped to Saito as follows: "The system according to claim 56, wherein in response to receiving a propagated update to a replica at a node, the node updates the parent directories for the file at the node" [Saito, pages 3-4, section 3.1 "Efficient Propagation Using Harbingers" with Saito, page 2, section 2 "Managing Replica Membership"].

**Claims 58, 59, 62, 64, and 65's** limitation(s) have already been met by Claims 20, 21, 24, 26, and 10's limitation(s), respectfully. Therefore, Claims 58, 59, 62, 64, and 65 are rejected for the same reason(s) as stated above with respect to Claims 20, 21, 24, 26, and 10, respectfully.

**Claim 66** can be mapped to Saito as follows: "The system according to claim 56, wherein in response to a user accessing a file at a node, a replica of the file is formed at the node" [Saito, page 2, Fig. 1, with Saito, page 2, section 2 "Managing Replica Membership" with Saito, page 3, section 2.1 "Adding a Replica"].

***Claim Rejections - 35 USC § 103***

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

15. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

16. Claims 5, 22, 42, and 60 is rejected under 35 U.S.C. 103(a) as being unpatentable over "Pangaea: A Symbiotic Wide-Area File System" (Saito et al.) (found in Applicant's IDS) in view of "Archipelago: An Island Based File System For Highly Available and Scalable Internet Services" (Ji et al.) (found in Applicant's IDS).

For **Claim 5**, Saito teaches: "The method according to claim 3."

Saito discloses the above limitation but does not expressly teach: "wherein multiple modifications to the parent directories at the node are performed according to an order in which corresponding updates occur."

With respect to Claim 5, an analogous art, Ji, teaches: "wherein multiple modifications to the parent directories at the node are performed according to an order in which corresponding updates occur" [Ji, page 5, section 4.2].

It would have been obvious to one of ordinary skill in the art at the time of invention to combine Ji with Saito because both inventions are directed towards maintaining consistency in distributed file replication/redundancy.

Ji's invention would have been expected to successfully work well with Saito's invention because both inventions use computers to do distributed file replication/redundancy. Saito discloses the Pangaea symbiotic wide-area file system comprising updating replicas and their parent directories, however Saito does not expressly disclose updating replicas and their parent directories in an order in which they occurred. Ji discloses archipelago: an island based file system for highly available and scalable internet services comprising serialized updates.

It would have been obvious to one of ordinary skill in the art at the time of invention to take the serialized updates from Ji and install it into the wide-area file system of Saito, thereby offering the obvious advantage of maintaining a higher consistency protocol than that of Saito.

For **Claim 22**, Saito teaches: "The method according to claim 20."

Saito discloses the above limitation but does not expressly teach: "wherein multiple modifications to the parent directories at the node are performed according to an order in which corresponding updates occur."

With respect to Claim 22, an analogous art, Ji, teaches: "wherein multiple modifications to the parent directories at the node are performed according to an order in which corresponding updates occur" [Ji, page 5, section 4.2].

It would have been obvious to one of ordinary skill in the art at the time of invention to combine Ji with Saito because both inventions are directed towards maintaining consistency in distributed file replication/redundancy.

Ji's invention would have been expected to successfully work well with Saito's invention because both inventions use computers to do distributed file replication/redundancy. Saito discloses the Pangaea symbiotic wide-area file system comprising updating replicas and their parent directories, however Saito does not expressly disclose updating replicas and their parent directories in an order in which they occurred. Ji discloses archipelago: an island based file system for highly available and scalable internet services comprising serialized updates.

It would have been obvious to one of ordinary skill in the art at the time of invention to take the serialized updates from Ji and install it into the wide-area file system of Saito, thereby offering the obvious advantage of maintaining a higher consistency protocol than that of Saito.

**Claim 42** encompasses substantially the same scope of the invention as that of Claim 22 in addition to a method and some steps for performing the method of Claim 22. Therefore, Claim 42 is rejected for the same reasons as stated above with respect to Claim 22.

**Claim 60's** limitation(s) have already been met by Claim 22's limitation(s).

Therefore, Claim 60 is rejected for the same reason(s) as stated above with respect to Claim 22.

17. Claim 6, 23, 43, and 61 is rejected under 35 U.S.C. 103(a) as being unpatentable over "Pangaea: A Symbiotic Wide-Area File System" (Saito et al.) (found in Applicant's IDS) in view of "Detection of Mutual Inconsistency in Distributed Systems" (Parker et al.) (found in Applicant's IDS).

For **Claim 6**, Saito teaches: "The method according to claim 3."

Saito discloses the above limitation but does not expressly teach: "wherein a modification is performed at the node and an earlier inconsistent modification is ignored."

With respect to Claim 6, an analogous art, Parker, teaches: "wherein a modification is performed at the node and an earlier inconsistent modification is ignored" [Parker, pages 244-245 Section III C, and Section IV].

It would have been obvious to one of ordinary skill in the art at the time of invention to combine Parker with Saito because both inventions are directed towards conflict resolution.

Parker's invention would have been expected to successfully work well with Saito's invention because both inventions use version vector based algorithms for conflict resolution. Saito discloses the Pangaea symbiotic wide-area file system comprising updating replicas and their parent directories, however Saito does not



expressly disclose wherein a modification is performed at the node and an earlier inconsistent modification is ignored. Parker discloses the detection of mutual inconsistency in distributed systems comprising using version vectors to determine how recent an update is.

It would have been obvious to one of ordinary skill in the art at the time of invention to take the details of version vectors from Parker and install it into the wide-area file system of Saito, thereby offering the obvious advantage of only using most recent consistent data thereby guaranteeing integrity.

For **Claim 23**, Saito teaches: "The method according to claim 20."

Saito discloses the above limitation but does not expressly teach: "wherein a modification is performed at the node and an earlier inconsistent modification is ignored."

With respect to Claim 23, an analogous art, Parker, teaches: "wherein a modification is performed at the node and an earlier inconsistent modification is ignored" [Parker, pages 244-245 Section III C, and Section IV].

It would have been obvious to one of ordinary skill in the art at the time of invention to combine Parker with Saito because both inventions are directed towards conflict resolution.

Parker's invention would have been expected to successfully work well with Saito's invention because both inventions use version vector based algorithms for conflict resolution. Saito discloses the Pangaea symbiotic wide-area file system comprising updating replicas and their parent directories, however Saito does not

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expressly disclose wherein a modification is performed at the node and an earlier inconsistent modification is ignored. Parker discloses the detection of mutual inconsistency in distributed systems comprising using version vectors to determine how recent an update is.

It would have been obvious to one of ordinary skill in the art at the time of invention to take the details of version vectors from Parker and install it into the wide-area file system of Saito, thereby offering the obvious advantage of only using most recent consistent data thereby guaranteeing integrity.

**Claim 43** encompasses substantially the same scope of the invention as that of Claim 23 in addition to a method and some steps for performing the method of Claim 23. Therefore, Claim 43 is rejected for the same reasons as stated above with respect to Claim 23.

**Claim 61's** limitation(s) have already been met by Claim 23's limitation(s). Therefore, Claim 61 is rejected for the same reason(s) as stated above with respect to Claim 23.

18. Claim 8, 9, 25, 45, and 63 is rejected under 35 U.S.C. 103(a) as being unpatentable over "Pangaea: A Symbiotic Wide-Area File System" (Saito et al.) (found in Applicant's IDS) in view of "Designing a Robust Namespace for Distributed File Services" (Zhang et al.) (found in Applicant's IDS).

For **Claim 8**, Saito teaches: "The method according to claim 7."

Saito discloses the above limitation but does not expressly teach: “wherein the directory operation is selected from a group consisting of rename, link and unlink.”

With respect to Claim 8, an analogous art, Zhang, teaches: “wherein the directory operation is selected from a group consisting of rename, link and unlink” [Zhang, page 2, section 2 “Problem Abstraction” with Zhang, page 4, Fig. 3 with Zhang, page 5, Fig. 4].

It would have been obvious to one of ordinary skill in the art at the time of invention to combine Zhang with Saito because both inventions are directed towards distributed storage services with namespaces.

Zhang’s invention would have been expected to successfully work well with Saito’s invention because both inventions use files and directories with namespaces for distributed storage. Saito discloses the Pangaea symbiotic wide-area file system comprising pointers, edges, and links, however Saito does not expressly disclose that these pointers are effected by directory operations consisting of rename, link and unlink. Zhang discloses the designing of a robust namespace for distributed file services comprising such operations effecting backpointers.

It would have been obvious to one of ordinary skill in the art at the time of invention to take the backpointer details from Zhang and install it into the wide-area file system of Saito, thereby offering the obvious advantage of breaking down file service operations into simple namespace primitives for easy namespace consistency and/or operation recovery.

**Claim 9** can be mapped to Saito (as modified by Zhang) as follows: "The method according to claim 8, wherein when the backpointer for a replica at a node is not consistent with the parent directories for the replica at the node, further comprising modifying the parent directories to be consistent with the backpointer [Saito, page 3, section 2.2 "Removing a Replica" with Saito, page 3, section 2.3 "Maintaining Hierarchical Name Space Using Golden Replicas"].

For **Claim 25**, Saito teaches: "The method according to claim 24."

Saito discloses the above limitation but does not expressly teach: "wherein the directory operation is selected from a group consisting of rename, link and unlink."

With respect to Claim 25, an analogous art, Zhang, teaches: "wherein the directory operation is selected from a group consisting of rename, link and unlink" [Zhang, page 2, section 2 "Problem Abstraction" with Zhang, page 4, Fig. 3 with Zhang, page 5, Fig. 4].

It would have been obvious to one of ordinary skill in the art at the time of invention to combine Zhang with Saito because both inventions are directed towards distributed storage services with namespaces.

Zhang's invention would have been expected to successfully work well with Saito's invention because both inventions use files and directories with namespaces for distributed storage. Saito discloses the Pangaea symbiotic wide-area file system comprising pointers, edges, and links, however Saito does not expressly disclose that these pointers are effected by directory operations consisting of rename, link and unlink.

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Zhang discloses the designing of a robust namespace for distributed file services comprising such operations effecting backpointers.

It would have been obvious to one of ordinary skill in the art at the time of invention to take the backpointer details from Zhang and install it into the wide-area file system of Saito, thereby offering the obvious advantage of breaking down file service operations into simple namespace primitives for easy namespace consistency and/or operation recovery.

**Claim 45** encompasses substantially the same scope of the invention as that of Claim 25 in addition to a method and some steps for performing the method of Claim 25. Therefore, Claim 45 is rejected for the same reasons as stated above with respect to Claim 25.

**Claim 63's** limitation(s) have already been met by Claim 25's limitation(s). Therefore, Claim 63 is rejected for the same reason(s) as stated above with respect to Claim 25.

19. Claims 13, 15, 29, 31, 49, 51, 67, and 69 are rejected under 35 U.S.C. 103(a) as being unpatentable over "Pangaea: A Symbiotic Wide-Area File System" (Saito et al.) (found in Applicant's IDS) in view of U.S. Patent No. 6,070,164 (Vagnozzi).

For **Claim 13**, Saito teaches: "The method according to claim 1."

Saito discloses the above limitation but does not expressly teach: "wherein a replica is deleted by marking the replica as invalid."

With respect to Claim 13, an analogous art, Vagnozzi, teaches: "wherein a replica is deleted by marking the replica as invalid" [Vagnozzi, col. 4, lines 65-67 with Saito, page 1, section 1 "Introduction"].

It would have been obvious to one of ordinary skill in the art at the time of invention to combine Vagnozzi with Saito because both inventions are directed towards deleting objects.

Vagnozzi's invention would have been expected to successfully work well with Saito's invention because both inventions use computers. Saito discloses the Pangaea symbiotic wide-area file system comprising deleting replicas, however Saito does not expressly disclose marking objects/replicas as invalid. Vagnozzi discloses a database method and apparatus using a hierarchical bit vector index structure comprising marking objects/replicas as invalid.

It would have been obvious to one of ordinary skill in the art at the time of invention to take the marking objects/replicas as invalid from Vagnozzi and install it into the wide-area file system of Saito thereby offering the obvious advantage of having the objects/replicas still available after "deletion" (marking invalid) so that the objects/replicas may be recovered by a user if necessary.

**Claim 15** can be mapped to Saito (as modified by Vagnozzi) as follows: "The method according to claim 13, further comprising periodically removing replicas marked as invalid" [Saito, page 3, section 2.2 "Removing a Replica" with Vagnozzi, col. 4, lines 65-67].

For **Claim 29**, Saito teaches: "The method according to claim 16."

Saito discloses the above limitation but does not expressly teach: “wherein a replica is deleted by marking the replica as invalid.”

With respect to Claim 29, an analogous art, Vagnozzi, teaches: “wherein a replica is deleted by marking the replica as invalid” [Vagnozzi, col. 4, lines 65-67 with Saito, page 1, section 1 “Introduction”].

It would have been obvious to one of ordinary skill in the art at the time of invention to combine Vagnozzi with Saito because both inventions are directed towards deleting objects.

Vagnozzi’s invention would have been expected to successfully work well with Saito’s invention because both inventions use computers. Saito discloses the Pangaea symbiotic wide-area file system comprising deleting replicas, however Saito does not expressly disclose marking objects/replicas as invalid. Vagnozzi discloses a database method and apparatus using a hierarchical bit vector index structure comprising marking objects/replicas as invalid.

It would have been obvious to one of ordinary skill in the art at the time of invention to take the marking objects/replicas as invalid from Vagnozzi and install it into the wide-area file system of Saito thereby offering the obvious advantage of having the objects/replicas still available after “deletion” (marking invalid) so that the objects/replicas may be recovered by a user if necessary.

**Claim 31** can be mapped to Saito (as modified by Vagnozzi) as follows: “The method according to claim 29, further comprising periodically removing replicas marked

as invalid" [Saito, page 3, section 2.2 "Removing a Replica" with Vagnozzi, col. 4, lines 65-67].

**Claims 49 and 51** encompass substantially the same scope of the invention as that of Claims 29 and 31, respectfully, in addition to an apparatus and some means for performing the method of Claims 29 and 31, respectfully. Therefore, Claims 49 and 51 are rejected for the same reasons as stated above with respect to Claims 29 and 31, respectfully.

**Claims 67 and 69's** limitation(s) have already been met by Claims 29 and 31's limitation(s), respectfully. Therefore, Claims 67 and 69 are rejected for the same reason(s) as stated above with respect to Claims 29 and 31, respectfully.

20. Claims 14, 30, 50, and 68 are rejected under 35 U.S.C. 103(a) as being unpatentable over "Pangaea: A Symbiotic Wide-Area File System" (Saito et al.) (found in Applicant's IDS) in view of U.S. Patent No. 6,070,164 (Vagnozzi), further in view of "Designing a Robust Namespace for Distributed File Services" (Zhang et al.) (found in Applicant's IDS).

21. For **Claim 14**, Saito (as modified by Vagnozzi) teaches: "The method according to claim 13."

Saito (as modified by Vagnozzi) discloses the above limitation but does not expressly teach: "wherein said marking the replica as invalid comprises removing the backpointer for the replica."



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With respect to Claim 14, an analogous art, Zhang, teaches: "wherein said marking the replica as invalid comprises removing the backpointer for the replica" [Zhang, page 3, section 2 "Problem Abstraction"].

It would have been obvious to one of ordinary skill in the art at the time of invention to combine Zhang with Saito (as modified by Vagnozzi) because both inventions are directed towards distributed storage services with namespaces.

Zhang's invention would have been expected to successfully work well with Saito (as modified by Vagnozzi)'s invention because both inventions use files and directories with namespaces for distributed storage. Saito (as modified by Vagnozzi) discloses the Pangaea symbiotic wide-area file system comprising deleting replicas, however Saito (as modified by Vagnozzi) does not expressly disclose marking the replica as invalid comprises removing the backpointer for the replica. Zhang discloses the designing of a robust namespace for distributed file services comprising removing the backpointer for the replica.

It would have been obvious to one of ordinary skill in the art at the time of invention to take the removing the backpointer for the replica from Zhang and install it into the invention of Saito (as modified by Vagnozzi), thereby offering the obvious advantage of an efficient way of creating an orphaned object, thereby violating Zhang's namespace rules and requiring special considerations for namespace integrity.

For **Claim 30**, Saito (as modified by Vagnozzi) teaches: "The method according to claim 29."

Saito (as modified by Vagnozzi) discloses the above limitation but does not expressly teach: "wherein said marking the replica as invalid comprises removing the backpointer for the replica."

With respect to Claim 30, an analogous art, Zhang, teaches: "wherein said marking the replica as invalid comprises removing the backpointer for the replica" [Zhang, page 3, section 2 "Problem Abstraction"].

It would have been obvious to one of ordinary skill in the art at the time of invention to combine Zhang with Saito (as modified by Vagnozzi) because both inventions are directed towards distributed storage services with namespaces.

Zhang's invention would have been expected to successfully work well with Saito (as modified by Vagnozzi)'s invention because both inventions use files and directories with namespaces for distributed storage. Saito (as modified by Vagnozzi) discloses the Pangaea symbiotic wide-area file system comprising deleting replicas, however Saito (as modified by Vagnozzi) does not expressly disclose marking the replica as invalid comprises removing the backpointer for the replica. Zhang discloses the designing of a robust namespace for distributed file services comprising removing the backpointer for the replica.

It would have been obvious to one of ordinary skill in the art at the time of invention to take the removing the backpointer for the replica from Zhang and install it into the invention of Saito (as modified by Vagnozzi), thereby offering the obvious advantage of an efficient way of creating an orphaned object, thereby violating Zhang's namespace rules and requiring special considerations for namespace integrity.

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**Claim 50** encompasses substantially the same scope of the invention as that of Claim 30 in addition to a method and some steps for performing the method of Claim 30. Therefore, Claim 50 is rejected for the same reasons as stated above with respect to Claim 30.

**Claim 68's** limitation(s) have already been met by Claim 30's limitation(s). Therefore, Claim 68 is rejected for the same reason(s) as stated above with respect to Claim 30.

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**Conclusion**


22. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Applicant is advised that, although not used in the rejections above, prior art cited on the PTO-892 form and not relied upon is considered materially relevant to the applicant's claimed invention and/or portions of the claimed invention.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brent S. Stace whose telephone number is 571-272-8372 and fax number is 571-273-8372. The examiner can normally be reached on M-F 9am-5:30pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jeffrey A. Gaffin can be reached on 571-272-4146. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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